Relationship between Learning Behavior in Physical Education Practice and Factors like General Attitude toward Physical Practice, Personality Traits, and Physical Fitness in Female College Students

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Abstract

Various factors seem to relate to learning behavior in physical education practice classes. The general attitudes made up of physical education practice college students took before will be one of the most important factors influencing it. The purpose of this study was to examine the relationship between general attitudes toward physical education practice and learning behavior, and to compare the contribution of general attitudes, personality traits, and physical fitness to learning behavior, using female college students as the subjects. In the results of statistical analysis from various perspectives, the general attitudes seemed to influence learning behavior, especially positive behavior, and to have the greatest contribution to it among the above-mentioned 3 domains selected in this study.

Introduction

Learning behavior during physical education practice in college classes seems to be determined by the following compound factor: the teacher, teaching materials, facilities and equipment, curricula, etc. On the other hand, the general attitude toward physical education practice is considered to be made up of physical education practice students took in elementary -, junior high- and high-schools. Also individual factors like general attitude, personality traits and physical fitness will influence learning behavior greatly.

Although the above-mentioned idea has been asserted by many researchers[1-2)4-6)9)10-15)17)18)] little concrete study on the relationship between learning behavior and factors influencing it has been done because effective tests were not constructed.

An inventory to measure learning behavior in physical education practice by Demura et al.[1)] and an inventory to measure general attitude toward physical education practice by Demura[3)] were constructed through rational and objective procedures. Further, Demura[2)] studied the relationship between learning behavior of female college students and personality

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traits and physical fitness, determining that these factors contribute to learning behavior in physical education practice to some extent.

The purpose of this study was to determine the relationship between learning behavior and general attitude toward physical education practice, and between learning behavior and the compound factor of general attitude, personality traits, and physical fitness, using female college students.

Ⅰ. Methods

Sample

A total of 1284 female college students were selected as the subjects (mean age=18.8 yr). They took any physical education practice class of tennis, handball, basketball, volleyball, table tennis, and badminton. Some of them were engaged in sports club activity in junior-and senior-high schools, and college. The following tests were administered to them for the purpose of the present study during the last week of each semester. Because of eliminating unclear data before practical statistical analysis, some inconsistency in sample sizes of each variable (see Table 1) occured.

An inventory on learning behavior in physical education practice

An inventory which Demura et al.[1] constructed to measure learning behavior of female college students after examining statistical validity, reliability, and practicability was used in this study. This is composed of 20 items representing 8 learning behavior factors (see Table 1). Each subject respond to each question with any of 7 points.

An inventory on general attitude toward physical education practice

Demura[3] examined 76 question items on general attitude toward physical education practice, being used by Noguch et al.[10-15] to evaluate it, from statistical perspectives, and finally constructed an inventory for female college students, taking into account practicability. This consists of 28 items representing 7 general attitude factors toward physical education practice. This was used to determine general attitude. Liker's method[7] was used for scale composition (5 points). Table 1 shows the name of 7 attitude factors.

Personality Inventory

The Yatabe-Guilford Personality Inventory(Y-G test)[16] was used to measure students' personality traits. This consists of 120 question items and based on them, 12 personality trait scales as shown in Table 1 are evaluated.

Physical fitness tests

Physical fitness for performance is generally assumed to consist of elements like muscular strength(grip strength and back strength), endurance(one-minute squat thrust), power(vertical jump), flexibility(standing-forward trunk flexion and trunk-bending in a prone state), and agility(side-step). For physical elements in which plural items were selected, their mean was calculated as a physical element score after raw data were standardized. The endurance test method was explained in the former study[2] and the other tests were done based on general

methods[8].

Statistical procedures

To examine the relationship between learning behavior factors and general attitudes factors, Pearson's correlation and canonical correlation were used. The latter is used to examine the relationship between variable groups representing each domain, although the former is between each single variable. The contribution of each domain like general attitudes, personality traits, and physical fitness to learning behavior was examined using multiple correlation and canonical correlation. The former has a criterion variable and its plural explanatory variables, and calculates the degree of relation between both. The latter does not have a criterion variable and both variable groups examining relation are regarded as the equal standpoint.

II. Results and discussion

1. Relationships between learning behavior factors and general attitude factors toward physical education practice.

Table 1 shows means and standard deviations of all variables selected in this study. Values in each physical fitness element show a mean of almost 50.0 because raw data were standardized(H-score) and a mean of plural variables with a different unit was calculated. Because the relationship between learning behavior(LB) and personality traits(PT) and physical fitness(PF) has already been examined in a previous study[2], the relationship between LB and general attitude toward physical education practice(GA), and the compound factor of GA, PT, and PF is mainly discussed in this section. Pearson's correlations and canonical correlations between LB factors and GA factors are shown in Tables 2 and 3, respectively. As has been stated in statistical procedures, both correlations are somewhat different, although they are the same in being used to examine the relationship between variables.

Seeing correlation coefficients between LB factors and GA factors, most values show significance although the size is not so high. As a whole, values in both tables seem to be almost of the same size. The highest value is found between positive-and negative learning behavior(F1, each sign is the same as that in Table 1.) and a good feeling toward physical education practice(F3) (0.558 in Table 2 and 0.593 in Table 3). Insincere-disturbing learning behavior(F3) shows an insignificant value with some GA factors, and also correlation coefficients of F3 with GA factors are lower than those of the other LB factors with GA factors. From the above-mentioned results, the general attitude toward physical education practice made up through physical education practice which female college students took before seems to somewhat influence various learning behavior in physical education practice in college classess. Among the 7 GA factors selected in this study, especially a good feeling toward physical education practice is considered to contribute strongly to positive or negative learning behavior. Namely, students with a better feeling toward physical education practice behave positively in physical education classess. Further, many general attitude factors toward

physical education practice hardly seems to influence insincere-disturbing learning behavior.

Next, seeing multiple correlations between each LB factor and 7 GA factors shown in Table 2, and canonical correlations between each LB factor and all variables representing 7 GA factors shown in Table 3, any value shows to be slightly greater than that between each simple factor. For example, although F1 shows a simple correlation value of 0.558 with F3, a multiple

Table 1. Means and standard deviations of learning behavior factors, general attitude factors, personality traits, and physical fitness elements.

No.		variable	NS	AV	SD
	F1	positive-negative	1274	18.34	4.09
	F2	solving problems through discussion	1273	8.35	2.34
	F3	insincere-disturbing	1274	7.00	2.16
LB	F4	expecting admiration	1274	6.96	2.72
	F5	prepareation and review	1274	7.20	2.28
	F6	comparison and observation	1274	18.80	3.52
	F7	obedience and observance	1274	12.14	1.26
	F8	deliberation and safe confirmation	1274	8.85	2.67
	To	total score	1274	87.63	12.03
	F1	mental-effect	1278	14.32	2.26
	F2	value-negation	1278	15.12	2.13
	F3	good feeling	1278	14.64	2.74
GA	F4	physical-and technical-effect	1278	15.10	2.06
	F5	character-shaping	1278	13.51	2.04
	F6	physical-and mental-tension relaxation	1278	15.22	1.85
	F7	future-and social-value	1278	13.59	1.98
	To	total score	1278	101.50	10.83
	1	depression	1283	9.30	5.56
	2	cycle tendency	1283	10.13	4.66
	3	inferiority	1283	8.99	4.74
	4	nervousness	1283	8.86	4.71
	5	lack of objectivity	1283	7.85	3.98
PT	6	lack of cooperativeness	1283	6.42	3.61
	7	agressiveness	1283	10.84	3.97
	8	general activity	1283	11.21	3.89
	9	rhathymia	1283	13.03	4.16
	10	thinking activity	1283	10.84	4.12
	11	ascendance	1283	10.05	4.65
	12	social extraversion	1283	13.62	4.31
	F1	muscular strength	1256	50.00	8.69
	F2	power	1255	50.00	10.00
	F3	flexibility	1255	50.00	7.68
PF	F4	agility	1251	50.08	9.78
	F5	endurance	1248	50.00	10.00
	F6	physique	1268	50.02	8.39
	To	total score	1284	293.44	47.93

Note: LB=learning behavior factors in physical education practice(PEP),
GA=general attitude factors toward PEP, PT=personality traits,
PF=physical fitness elements.
F1, F6, and F7 in LB are a total score of 4 variables and the other factors 2 variables. A value of each factor in PF is a standardized score(H-score) or its means.

correlation coefficient of F1 with 7 GA factors is 0.566. Namely, the latter is higher by only 0.008. Canonical correlation(see Table 3) shows almost the same result. This means that one GA factor with the highest correlation values influences certain special learning behavior to almost the same degree as the compound of all GA factors. In other words, a general attitude factor with especially close relationship to each learning behavior seems to exist like the relationship between a positive-negative learning behavior and a good feeling toward physical education practice. Kobayashi[4-6] asserted that childrens' attitudes toward physical education practice have close relationship to learning behavior during physical education practice classes. The present results seem to substantiate that attitudes made up of physical education practice, female college students took in an elementary school to a high school relate closely to learning behavior during physical education practice classes in college.

2. Contribution of the compound factor of general attitudes, personality traits, and physical fitness to each learning behavior factor.

Fig. 1. shows multiple correlations between each learning behavior(LB) factor and each domain of general attitudes(GA), personality traits(PT), and physical fitness(PF), and the compound factor(GPP) of the above-mentioned 3 domains with a pole graph. Insignificant correlation coefficients were found only between 3 LB factors of F3, F7, and F8, and PH. Also coefficients between LB factors except for F1 and PH show a lower value below 0.20 in spite of a multiple correlation coefficient. The same results[2] were determined also in an analysis from a somewhat different angle. Therefore, superiority or inferiority of physical fitness hardly seems to relate to LB(especially behaviors like insincere-disturbing, obedience and observance, and deliberation and safe confirmation), but to influence positive or negative learning behavior.

Comparing coefficients between each LB factor and each domain of GA, PT, and PH, as a whole, values with GA as compared with those with PT and PH are somewhat greater. In case of the multiple correlation, the more the number of the explanatory variable increases, the greater a value generally becomes. However, e. g., a value between F1 and GA is greater than that between F1 and PT, although PT has a more variable-number(see Table 1). Taking into account the number of a variable representing each domain of GA, PT, and PH, among 3 domains, general attitudes toward physical education practice seem to influence learning behavior greater than personality traits and physical fitness, although a slight difference by each learning behavior exists.

Correlations between each LB factor and GPP(i. e., the compound factor of GA, PT, and PF) are somewhat greater than those between each LB factor and GA, PT, and PF. Therefore, the compound factor of GA, PT, and PH is inferred to influence learning behavior greater than their independent domain. Namely, students who admit value and effects of physical education practice, and have a better feeling toward it, a positive personality trait, and superior physical fitness, seem to behave positively and earnestly in physical education practice in college classes more than those who have the same trait only in any of the above-mentioned factors. The highest value is found between F1 and GPF, with 0.702 of a relatively high value.

Table 2. Pearson's correlations and multiple correlations between learning behavior factors and general attitude factors.

		general attitude factors								
	factor	F1	F2	F3	F4	F5	F6	F7	To	ML
LB	F1	0.184**	0.307**	0.558**	0.174**	0.196**	0.234**	0.157**	0.379**	0.566**
	F2	0.227**	0.208**	0.302**	0.215**	0.230**	0.207**	0.144**	0.310**	0.343**
	F3	0.065*	0.115**	-0.022	0.109**	0.085**	0.029	0.088**	0.088**	0.178**
	F4	0.088**	0.069*	0.218**	0.103**	0.110**	0.097**	0.109**	0.164**	0.230**
	F5	0.241**	0.174**	0.232**	0.231**	0.198**	0.138**	0.233**	0.290**	0.314**
	F6	0.169**	0.157**	0.241**	0.184**	0.173**	0.128**	0.184**	0.250**	0.277**
	F7	0.164**	0.219**	0.187**	0.156**	0.157**	0.141**	0.126**	0.231**	0.253**
	F8	0.149**	0.074**	0.082**	0.157**	0.201**	0.098**	0.145**	0.177**	0.209**
	To	0.284**	0.299**	0.446**	0.293**	0.301**	0.247**	0.265**	0.434**	0.485**

Note: LB=learning behavior factors, ML=multiple correlation coefficients

Table 3. Canonical correlations between learning behavior and general attitude factors.

	general attitude factors								
	factors	F1	F2	F3	F4	F5	F6	F7	AL
LB	F1	0.224**	0.359**	0.593**	0.245**	0.229**	0.244**	0.174**	0.604**
	F2	0.221**	0.201**	0.317**	0.203**	0.188**	0.204**	0.125**	0.347**
	F3	0.076	0.109**	0.050	0.111**	0.102**	0.040	0.096**	0.111**
	F4	0.082*	0.172**	0.229**	0.123**	0.134**	0.112**	0.113**	0.229**
	F5	0.236**	0.182**	0.207**	0.200**	0.159**	0.114**	0.216**	0.236**
	F6	0.159**	0.185**	0.244**	0.206**	0.166**	0.147**	0.179**	0.244**
	F7	0.163**	0.205**	0.193**	0.171**	0.167**	0.118**	0.115**	0.205**
	F8	0.143**	0.071	0.112**	0.127**	0.177**	0.103**	0.146**	0.177*

Note: AL means a canonical correlation of each learning behavior factors and all general attitude variables representing 7 attitude factors.

A correlation between learning behavior(8 factors) and general attitude(7 factors) is 0.630 and this value is significant at 1% level.

This means that a positive learning behavior can be explained for about 50% by the compound of general attitudes toward physical education practice, personality traits, and physical fitness.

Next, comparing between LB factors on correlation values between LB factors and each domain of GA, PT, and PH, values with F1 as compared with those with the other LB factors are, as a whole, relatively greater in any domain of GPF, GA, PT, and PH. Therefore, the general attitude toward physical education practice, personality traits, and physical fitness seem to influence especially a positive learning behavior among various learning behavior. Table 4 shows canonical correlations between each LB factors and GA, PT, PH, and GPP. Comparing values in Fig 1. with those in Table 4, as a whole, the latter shows somewhat lower values and more insignificance in spite of a similar statistical method examining relationships between variables. Probably, this depends on a difference as has already been explained in the section of statistical procedures. For example, in a multiple correlation, a value of F1 is a mean of 4 variables and it makes a criterion variable. In case of a canonical correlation, also the degree of interrelation among 4 variables representing F1 factor influences a correlation

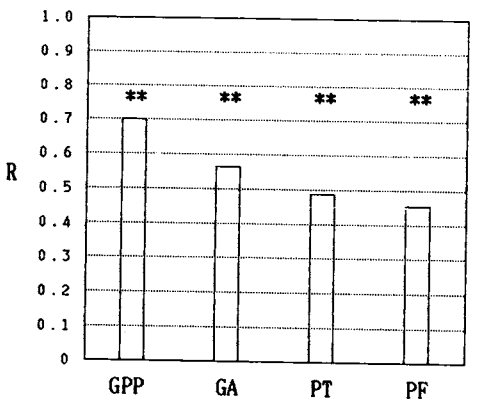
Table 4. Contribution of general attitude factors, personality traits, and physical fitness elements.

	LB = F1	F2	F3	F4	F5	F6	F7	F8	To
GPF	0.702**	0.449**	0.394**	0.344**	0.382**	0.359**	0.328**	0.311**	0.573**
GA	0.566**	0.343**	0.178**	0.230**	0.314**	0.277**	0.253**	0.209**	0.485**
PT	0.489**	0.354**	0.341**	0.264**	0.196**	0.235**	0.199**	0.226**	0.359**
PH	0.455**	0.181**	0.112	0.156**	0.139*	0.147*	0.081	0.086	0.288**

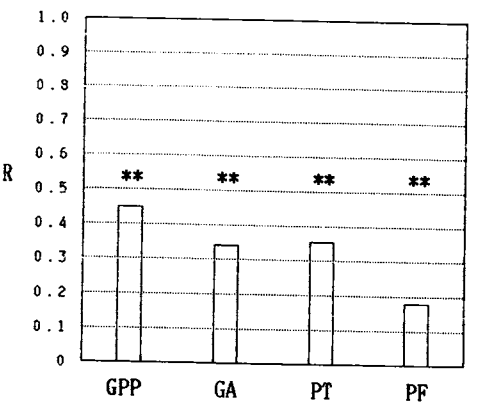
Note: LB=learning behavior factors, GPF=a multiple correlation between each LB factor and all factors of GA, PT, and PH.

value. Anyhow, the present results seem to suggest that when a statistical method used differs, the results obtained will be not necessary the same. However, a difference between both correlation values is only a little and a value below 0.30 does not seem to be so important when interpreted. Because it means, e. g., in case of a multiple correlation, plural explanatory

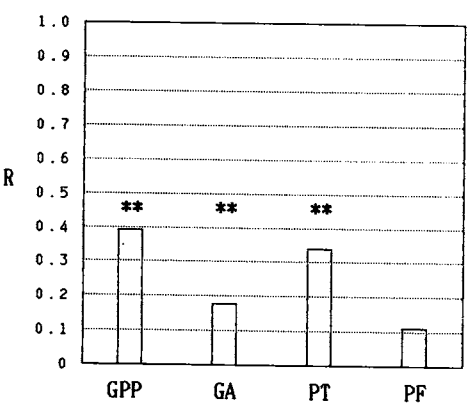
Positive-negative (F1)



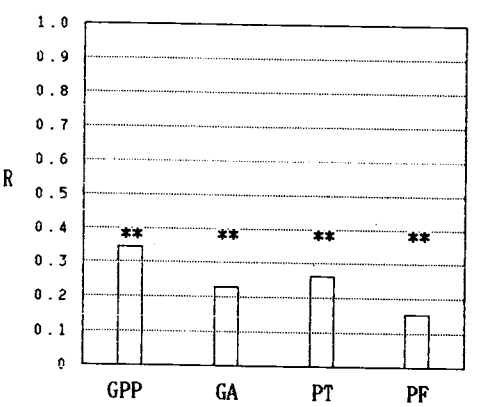
Solving problems through discussion (F2)



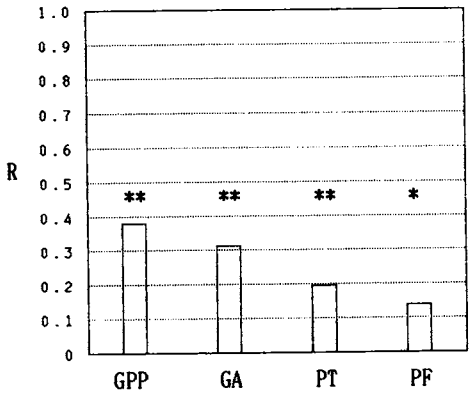
Insincere-disturbing (F3)



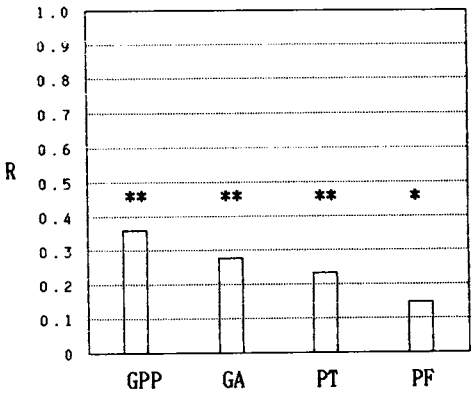
Expecting admiration (F4)



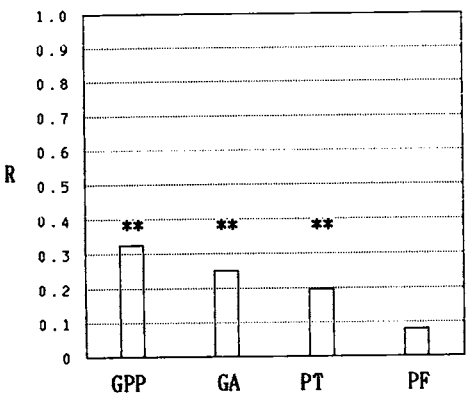
Preparation and review (F5)



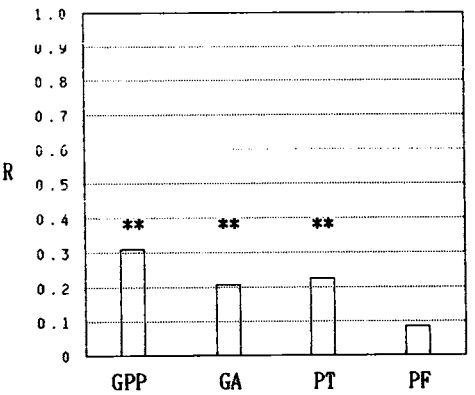
Comparison and observation (F6)



Obedience and observance (F7)



Deliberation and safe confirmation (F8)



Total score (T0)

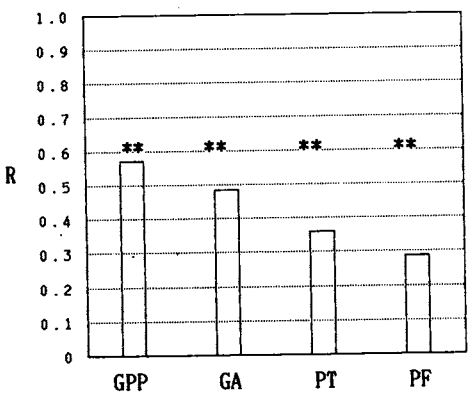


Fig. 1　Multiple correlations between each learning behavior factor from F1 to T0 and each domain of general attitude(GA) personality traits(PT), physical fitness(PF), and the compound factor(GPP) of the above-mentioned 3 domains
R: multiple correlation coefficient
＊＊ : $p < 0.01$　　＊ : $p < 0.05$

variables can explain F1 factor by only below 9% and the remaining 91% can be explained by other variables not selected in this study.

No studies comparing the contribution of general attitudes, personality traits, and physical fitness selected to learning behavior objectivity have been done. Therefore, it is difficult to examine the validity of the results obtained in this study. Pursuit studies on the above-mentioned problems will be necessary.

In summary, the general attitudes toward physical education practice female college students took before seem to influence various learning behavior, especially positive learning behavior, in physical education practice classes in college. In addition, among the above-mentioned 3 domains, the contribution of general attitudes to learning behavior is inferred to be the greatest.

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